

REMARKS

Reconsideration of this patent application is respectfully requested in view of the foregoing amendments, and the following remarks.

The amendments to this patent application are as follows.

The present Specification is being amended on pages 1, 5 and 14 in order to insert the required Section Headings. Also, the objected-to nomenclature "[1]", "[2]" and "[3]" on pages 1, 2, 3, 5, 6, 11, 12, 13, 14 and 26 has been cancelled and has been replaced by the following correct format "(1)", "(2)" and "(3)". In other words, brackets have been replaced by parentheses. Also on pages 1 and page 5, the reference to "claim 1" has been cancelled.

Claims 1 to 20 have been amended in order to cancel the language "characterized in that", and to replace this with the word "wherein" for claims 2 to 20, or the phrase "comprising the steps of" for claim 1. Also in claim 1, various editorial changes were made for steps (a), (b), (c), (d) and (e).

Regarding claim 1, the Patent Examiner objected to the phrases "possibly" and "such as" which allegedly renders the claim indefinite. In response to this objection to claim 1, claim 1 has been amended to cancel each of these objected-to words.

Regarding claim 3, the Patent Examiner objected to the phrase "such as" which allegedly renders the claim indefinite. In response to this objection to claim 3, claim 3 has been amended to change this to "comprising".

Regarding claim 4, the Patent Examiner objected to the phrase "preferably" which allegedly renders the claim indefinite. In response to this objection to claim 4, claim 4 has been amended to cancel "preferably of" and replaced with the word "are".

Regarding claim 8, the Patent Examiner objected to the phrase "preferably" which allegedly renders the claim indefinite. In response to this objection to claim 8, "preferably" has been cancelled and replaced by the word "or".

Regarding claim 15, the Patent Examiner objected to the phrase "preferably" which allegedly renders the claim indefinite. In response to this objection to claim 15, the word "preferably" has been cancelled.

Regarding claim 19, the Patent Examiner objected to the phrase "preferably" which allegedly renders the claim indefinite. In response to this objection to claim 19, the word "preferably" has been cancelled.

Regarding claim 20, the Patent Examiner objected to the phrase "if need be" which allegedly renders the claim indefinite. In response to this objection to claim 20, the phrase "if need be" has been cancelled.

For all these reasons, the Specification, and all the claims, are believed to be in complete compliance with all the requirements of 35 U.S.C. 112. Withdrawal of this ground of rejection is respectfully requested.

Reconsideration and withdrawal are respectfully requested for the provisional rejection of claims 1-20 under the judicially created doctrine of obviousness-type double patenting as being

unpatentable over claims 1-17 of copending Application No.

10/416,137.

It is respectfully submitted that there can be no possibility of double patenting based upon the copending *U.S. Patent Application Serial No. 10/416,137*. This copending application relates to a further development in the method being claimed here, which is characterized by a third reaction zone in which the reaction takes place in the presence of a catalyst. Thus, there is no overlapping claimed subject matter.

Withdrawal of this ground of rejection is respectfully requested.

The Applicants comment upon the prior art rejections of the claims under 35 U.S.C. 103 as being unpatentable over *Deglise et al.*, *U.S. Patent No. 4,568,362* in view of *McIntosh et al.*, *U.S. Patent No. 5,662,052*, and further in view of various combinations of *Velcich*, *U.S. Patent No. 5,262, 577* or *Rudolph et al.*, *U.S. Patent No. 3,738, 103*, or *Haberman*, *U.S. Patent No. 4,038,100* or *Gwyn et al.*, *U.S. Patent No. 4,110,193*, or *Olsen et al.*, *Unit Processes & Principles of Chem. Eng.*

The present invention is directed to a method for gasifying organic substances and substance mixtures, in connection with which the organic substances are split in a pyrolysis reactor through contact with a hot heat-carrying medium into a carbon-containing residue and pyrolysis gases; and the solid, carbon-containing residue is supplied to a firing stage and burned there, whereby at least proportions of the liberated heat are used for heating up the heat-carrying medium; and the pyrolysis gases, after adding a reactant steam in a second reaction zone, and with the use of at least a portion of the heat liberated in the firing stage, are after-heated through indirect heat exchange in such a way that a product with a high calorific value is obtained, comprising the steps of:

- (a) separating the heat-carrying medium, upon exiting from the pyrolysis reactor, from the solid, carbon-containing residue in a separation stage and supplying it to a heating-up zone;
- (b) burning the solid, carbon-containing residue in a firing stage;
- (c) passing the hot exhaust gases of the firing stage in the heating-up zone through a fill of the heat-carrying

medium, whereby they transfer a large part of their sensible heat to the heat-carrying medium;

- (d) extracting the heated-up heat-carrying medium from the heating-up zone into the second reaction zone designed in the form of a migrating bed reactor, where the mixture comprised of pyrolysis gases and reactant is heated up and converted into the product gas; and
- (e) recycling the heat-carrying medium into the pyrolysis reactor after passing through the second reaction zone.

The *Deglise* U.S. Patent No. 4,568,362 is already mentioned in the prior art portion of the Specification of the application. In *Deglise* no separation of the heat carrier medium from the solid residue that contains carbon takes place after leaving the pyrolysis reactor. Instead, the heat carrier particles are heated in direct contact with the burning, solid residues that contain carbon, as can be derived, for example, from claim 1, column 6, lines 28 to 30, column 2, lines 2 to 6, and column 3, lines 56 to 58. In fact, mixing of the heat carrier particles and the solid residue that contains carbon actually takes place (column 3, lines 9 to 11). One of the claimed process steps of the claimed invention is therefore specifically not disclosed by

U.S. Patent No. 4,568,362. The advantages of the present invention are explained in detail in the application.

According to the reference cited, separation takes place only between gases and solids. In particular, the ash is separated last, in separation stage 30. However, this is not the solid residue that contains carbon, which is specifically supposed to serve for heating the heat carrier medium, by means of combustion. Rather, it is the remaining residues after combustion of the residue that contains carbon (column 4, lines 11 to 20).

Other claimed differences can be seen in that the second stage of the claimed method, namely the reforming step, is not disclosed in the prior art reference cited. In particular, there is no inclusion of the heat carrier medium in the reforming process that takes place in this second reaction zone. Therefore, there are significant differences between the claimed invention and the prior art.

The deficiencies in the teachings of the primary reference to Deglise are not overcome by the disclosures of the secondary references.

The *McIntosh* U.S. Patent No. 5,662,052 in column 2, lines 42 to 57 discloses a reactor for solids pyrolysis or gasification. It consists of two co-axial rotary kilns, inner and outer, welded together and turning at the same RPM. Solid waste enters the inner kiln and is pyrolyzed to char. The char drops to the outer kiln where it is combusted with air to produce pyrolysis heat. Pyrolysis product in vapor form and combustion gas are removed separately from the reactor. Solids move from front to back through the outer kiln via left-handed spiral flights while solids move from back to front in the inner kiln via right-handed spiral flights.

Accordingly, *McIntosh* teaches providing a method, apparatus and system for converting organic waste materials into commercially useful products, such as liquid fuels or chemicals such as chloromethane and cyclohexene.

Thus, *McIntosh* fails to teach or to suggest the claimed invention.

The *Velcich* U.S. Patent No. 5,262,577 discloses in column 2, in lines 53 to 64 that in the process of gasification of a refuse derived fuel, the fine fraction of the ashes gathered from the

bottom of the gasification furnace and the ashes separated by the bag filter installed on the line of the gas downstream of the heat exchangers are recycled, and not sent directly to the disposal dump.

In *Velcich* the ashes from the bottom of the gasification furnace are rich in residual alkalinity and, according to the prior art, are sieved and divided into a fine fraction (smaller than 2-3 mm) and a coarse sintered fraction suitable for dumping.

Thus, *Velcich* fails to teach or to suggest the claimed invention.

The *Rudolph U.S. Patent No. 3,738,103* discloses in column 1, in lines 20 to 35 that the power plant process using gas turbines and liquid or gaseous (fluid) hydrocarbons as fuel may be improved if the feed fuel is thermally or catalytically cracked with steam and/or oxygen (air). Also, if desired, it is possible to use carbon dioxide, and under a pressure which is higher than the operating pressure in the combustion chamber, to form a mixture of carbon monoxide and hydrogen. This cracked gas is then expanded to perform work in a gas turbine to the inlet pressure of the succeeding power plant process. This succeeding

power plant process may be carried out in a gas turbine power plant or a steam boiler plant and begins in either case in a combustion chamber which produces hot combustion gas.

Thus, *Rudolph* fails to teach or to suggest the claimed invention.

The *Haberman* U.S. Patent No. 4,038,100 discloses in column 1, in lines 55 to 65 that solid material resulting from the pyrolysis of rubber containing carbon black may be utilized to replace, in substantial part, the carbon black utilized in the production of rubber tires and other rubber products if the char contains substantially no metal or fiberglass, has not been treated with acid, caustic or organic solvents, and the pyrolysis and grinding is conducted simultaneously by using heat carrying solids such as ceramic balls.

Thus, *Haberman* fails to teach or to suggest the claimed invention.

The *Gwyn* U.S. Patent No. 4,110,193 discloses in column 3, in lines 43 to 60 a process for heat treatment of subdivided solid materials containing substantially non-volatile carbonaceous

solids in order to convert said non-volatile carbonaceous solids substantially into volatile hydrocarbonaceous fluids, leaving upon heat treatment, a solid particulate carbonaceous material-containing residue. More particularly, there is a retorting process for subdivided solid materials, such as crushed oil shale, employing a particulate heat carrier in stage-wise heating and in heat recovery from the retorted particulate residue. Accordingly, a particulate heat carrier is passed downwardly at a substantially uniform rate through fluidized beds of the solid materials under the influence of gravitational force to effect the requisite sensible heat transfer. A primary feature is in the segregation of the heat carrier flows in order to minimize overall thermal stress on the heat carrier.

Thus, *Gwyn* fails to teach or to suggest the claimed invention.

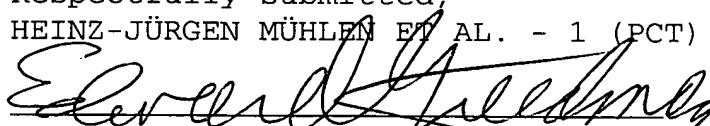
The *Olsen* reference discloses the availability of a source of heat supply for a given use is largely predetermined by its temperature, although other questions such as the chemical purity of the medium, the rigidity of temperature control required for the process, and other factors can be considered. Great economies can often be effected by seeking sources of supply of

heat from chemical processes, either exothermic or where heat has been added to cause sublimation or distillation, and afterwards partially recovered in condensers.

Thus, Olsen fails to teach or to suggest the claimed invention.

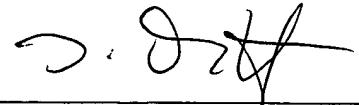
In conclusion, the present invention and all the pending claims are believed to be patentable under 35 U.S.C. 103 over all the prior art references applied by the Patent Examiner. Withdrawal of this ground of rejection is respectfully requested. A prompt notification of allowability is respectfully requested.

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Enclosures: 1. Copy of Petition for One Month Extension of Time

I hereby certify that this correspondence is being deposited with the U.S. Postal Service as first class mail in an envelope addressed to: Commissioner of Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on July 22, 2005.



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